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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/614,367	07/07/2003	Yonghe Liu	TI-35815	7859

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TEXAS INSTRUMENTS INCORPORATED
P O BOX 655474, M/S 3999
DALLAS, TX 75265

EXAMINER

HUYNH, CHUCK

ART UNIT PAPER NUMBER

2683

DATE MAILED: 06/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/614,367

Applicant(s)

LIU, YONGHE

Examiner

Chuck Huynh

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 7/7/2003.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claim 1, 2, 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Walton et al. (US 6662024) (hereinafter Walton) in view of Van Bokhorst et al. (hereinafter Bokhorst).

Regarding claim 1, Walton discloses a system for saving power in a wireless network, comprising:

an access point (base station; Fig. 1) having a priority queue (Abstract; Col 2, lines 41-46);

one or more stations (terminals) (Fig. 1; Col 2, lines 41-46);

an APSD frame (is disclosed by applicant to be well known) having schedule information of a data transmission to the one or more stations (Col 20, lines 9-17);

an algorithm for calculating a transmission power consumption of the data transmission for the stations (Col 26, lines 66-67 – Col 27, lines 1-2); and

wherein the access point originates and transmits to the one or more

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stations the APSD frame of the schedule information having a transmission order (priority) based on the receiving power consumption calculation stored within the priority queue of the access point (Col 13, lines 5-15; Col 20, lines 1-17), and

even though Walton does not fully disclose the aspect of the claim wherein the one or more stations selectively awake from a sleep mode for the data transmission therewith based on the schedule;

Van Bokhorst does disclose the aspect of the claim wherein the one or more stations selectively awake from a sleep mode for the data transmission therewith based on the schedule (Col 3, lines 63-64; Col 4, lines 2-5);

It would have been obvious to one ordinarily skilled in the art at the time of invention to transmit data to base stations that are awake to receive data transmission.

Regarding claim 2, Van Bokhorst discloses the system of claim 1, wherein the access point is configured to generate a TSPEC element comprising a PS interval for specifying a timing offset relative to the current transmission (Col 6, lines 1-8).

3. Claim 3,4,5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Walton in view of Van Bokhorst in further view of Benveniste.

Regarding claim 3 and 4, Beneviste discloses the system of claim 1, wherein the access point is further operable unicast an APSD frame to the one or more stations to alter one or more of the scheduled wake-up times of the station in response to errors on the network and to the arrival of higher priority data (Page 2, [0026]). Transmission in unicast or broadcast is both well known in the art of data transmission.

Regarding claim 5, it is inherent that the system of claim 1, wherein the access point and priority queue is operable to allow the access point to ignore current scheduling activities and perform scheduling in response to errors on the network and to the arrival of higher priority data with the disclosure of claim 3 and 4.

Regarding claim 6, Walton discloses the system of claim 1, wherein the algorithm for calculating the receiving power consumption of downlink data for the stations is a function of one of a rate of the data transmission (Col 14, lines 6-8; Col 20, line 15), a packet size of the data transmitted, a transmission time of the data transmitted, a packet length, a number of the packets in the transmission, and a combination thereof.

4. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Walton in view of Van Bokhorst in further view of Sunakawa.

Regarding claim 7, Walton in view of Van Bokhorst discloses all the particulars of the claim except the system of claim 1, wherein the algorithm is further operable to aggregate together a plurality of low power transmissions comprising all currently scheduled data to a PS station before calculating the receiving power consumption.

However, Sunakawa does disclose the system of claim 1, wherein the algorithm is further operable to aggregate together a plurality of low power transmissions comprising all currently scheduled data to a PS station before calculating the receiving power consumption (Col 10, lines 52-55; Col 12, lines 25-31, 42-49).

It would have been obvious to one ordinarily skilled in the art at the time of invention to sum up powers to calculate the total power consumption.

5. Claim 8, 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Walton in view of Van Bokhorst in further view of Bandeira.

Regarding claim 8, Walton in view of Van Bokhorst discloses all the particulars of the system except the system of claim 1, wherein the transmission order stored in the priority queue of the access point is ordered according to a higher priority assignment for the lowest receiving power consumption.

However, Bandeira does disclose the system of claim 1, wherein the transmission order stored in the priority queue of the access point is ordered according to a higher priority assignment for the lowest receiving power consumption (Page 6, [0064]).

It would have been obvious to one ordinarily skilled in the art at the time of invention to prioritize transmission order base on power capability for power saving by using resources efficiently.

Regarding claim 9, Walton in view of Van Bokhorst discloses all the particulars of the claim except the system of claim 1, wherein the priority queue of the access point is operable to order and enable the lowest transmission power downlink first.

However, Bandeira does disclose the system of claim 1, wherein the priority queue of the access point is operable to order and enable the lowest transmission power downlink first (Page 6, [0064]).

It would have been obvious to one ordinarily skilled in the art at the time of invention to prioritize transmission based on lowest output, transmission power to maximize data rate.

Regarding claim 10, Walton does disclose the system of claim 9, wherein the priority queue is further operable to order subsequent transmissions (priority scheduling is inherent to process in the order of priority)(Col 2, lines 41-46) but does not disclose based on which transmission has the lowest transmission power.

However, Bandeira does disclose transmission based on lowest transmission output power (Page 6, [0064]).

It would have been obvious to one ordinarily skilled in the art at the time of invention to combine the disclosures to establish a priority scheduling based on lowest output power for data transmission.

6. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Walton in view of Sunakawa.

Regarding claim 11, Walton discloses a method of saving power in a wireless network comprising an access point, one or more stations, an APSD frame (disclosed in applicant's disclosure to be well known in the art), and an algorithm for calculating a receiving power consumption of downlink data for the stations the method comprising (Abstract; Figure 1):

calculating the receiving power consumption of the data to be downlinked to the stations using the algorithm (Col 26, lines 66-67 – Col 27, lines 1-2);

determining a priority queue ordering of the transmissions based on the receiving power consumption calculated for each station (Col 13, lines 5-15; Col 20, lines 1-17);

transmitting the data to the one or more stations according to the schedule (Abstract).

Walton discloses all the particulars of the claim except scheduling an activation delay of the data transmission in the APSD frame for each station based on the transmission order from the receiving power consumption calculations.

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However, Sunakawa does disclose scheduling an activation delay of the data transmission in the APSD frame for each station based on the transmission order from the receiving power consumption calculations (Col 10, lines 15-25, 38-43, 54-58).

It would have been obvious to one ordinarily skilled in the art at the time of invention to incorporate a priority schedule of transmission based on power to provide efficient power saving usage.

7. Claim 12 -19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Walton in view of Sunakawa in further view of Van Bokhorst.

Regarding claim 12, Walton in view of Sunakawa discloses all the particulars of the claim except the method of claim 11, further comprising:

determining whether the frame queue is empty in the access point;

clearing the MORE DATA field in the last packet of the power save station

if the frame queue is empty in the access point;

disabling the transmission of the APSD frames until the next beacon; and

returning the station to the sleep mode until the next beacon.

However, Van Bokhorst discloses (Col 2, lines 7-25) determining whether the frame queue is empty in the access point (Col 2, lines 23-25);

clearing the MORE DATA field in the last packet of the power save station if the frame queue is empty in the access point;

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disabling the transmission of the APSD frames until the next beacon (Col 2, lines 20-23); and

returning the station to the sleep mode until the next beacon (Col 2, lines 20-23).

It would have been obvious to incorporate Van Bokhorst's disclosure to save operational power to the station when no data is being sent.

Regarding claim 13, Walton in view of Sunakawa discloses all the particulars of the claim except the method of claim 11, further comprising:

awaking a station from a sleep mode to monitor a beacon from the access point;
determining whether the station's association ID is indicated in the beacon;
returning the station to the sleep mode if the station's association ID is not indicated;

decoding the frames on the wireless channel
returning the station to the sleep mode until the next beacon, if the station's association ID matches in a frame and the MORE-DATA bit is set to zero.

However Van Bokhorst does disclose the method of claim 11, further comprising:
awaking a station from a sleep mode to monitor a beacon from the access point
(Col 5, line 67; Col 6, lines 1-9);

determining whether the station's association ID is indicated in the beacon (Col 5, line 67; Col 6, lines 1-9);

returning the station to the sleep mode if the station's association ID is not indicated (Col 5, line 67; Col 6, lines 1-9);

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decoding the frames on the wireless channel is well known in the art to establish communication; and

returning the station to the sleep mode until the next beacon, if the station's association ID matches in a frame and the MORE-DATA bit is set to zero (Col 2, lines 22-25).

It would have been obvious to one ordinarily skilled in the art at the time of invention to incorporate Van Bokhorst's disclosure to communicate to specific terminals and keep the others in sleep mode to provide power-saving capability.

Regarding claim 14, Van Bokhorst discloses the method of claim 13, wherein returning the station to sleep mode comprising returning the station to sleep mode after receipt of the APSD, and maintaining the station in sleep mode until the schedule data dictates that the station awaken (Col 5, lines 50-61).

Regarding claim 15, Van Bokhorst discloses the method of claim 13, further comprising:

determining whether downlink data is to be transmitted from the access point to the station if the station's association ID is indicated in the beacon (Col 4, lines 40-52);

keeping the station awake until APSD frame containing schedule data is received (Col 5, lines 1-16).

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Regarding claim 16, Van Bokhorst discloses the method of claim 15, further comprising returning the station to sleep mode after receipt of the APSD frame, and maintaining the station in sleep mode until the schedule data dictates that the station awaken (Col 6, lines 17-39).

Regarding claim 17, Van Bokhorst discloses the method of claim 13, wherein awaking the station to monitor a beacon from the access point, comprises awaking the station at a periodic time to monitor a beacon from the access point (Col 5, lines 18-30).

Regarding claim 18, Van Bokhorst discloses the method of claim 13, wherein determining whether a station's association ID is indicated, comprises determining whether a stations association ID is indicated within a TIM of the beacon (Col 4, lines 40-52).

Regarding claim 19, The method of claim 11, further comprising:
sending out the APSD frames containing the schedule data (is well known in the art and disclosed by the applicant in summary of the invention);
clearing a MORE-DATA field in the last packet of the priority queue (no data messages) (Col 5, lines 55-62);
allowing the station to go into sleep mode until the next beacon (Col 5, lines 18-30).

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The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Benveniste, Mathilde discloses a power-saving mechanism for periodic traffic streams in wireless local-area networks (Automatic Power-Save Delivery).

Kadaba, Srinivas R. discloses Multiple mode data communication system and method and forward and/or reverse link control channel structure

Meier, Robert discloses a Method for a simple 802.11e HCF implementation

Gilbertson; Roger Lee et al. discloses a Method and apparatus for prioritizing delivery of data transfer requests

Tiedemann, Jr.; Edward G et al. discloses a Method and apparatus for forward link rate scheduling

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chuck Huynh whose telephone number is 571-272-7866. The examiner can normally be reached on M-F 8am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William Trost can be reached on 571-272-7872. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Chuck Huynh



WILLIAM TROST
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600